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[BRO 1424 - 2002 085 EM]SEAT ASSEMBLY FOR A MOTOR VEHICLE SEAT

[Description]

CROSS-REFERENCE TO RELATED APPLICATION(S)

This application claims priority of German Patent Application Number 103 06 541.5, filed on February 13, 2003, and German Patent Application Number 10 2004 006 051.7, filed on January 30, 2004.

BACKGROUND OF THE INVENTION

[The invention relates to a]A seat assembly for a motor vehicle seat[according to the generic part of claim 1.][Such a seat assembly] comprises a seat element [that constitutes]constituting a component of [the]a seat structure of a motor vehicle seat[;], a tubular drive element (drive tube) connected pivotably (around its longitudinal axis) to the seat element [that constitutes]constituting a component of a displacement arrangement for an adjustable seat part[, for example, for] (such as a height adjustable seat cushion), as well as a[(preferably] weight sensor (which in an exemplary embodiment is electrically operated) [weight sensor]for the detection of seat occupancy using the weight of a person sitting in the

corresponding motor vehicle seat. Through the detection of seat occupancy, it is possible to control various functional groups of a motor vehicle as a function of ~~seat occupancy,~~that seat occupancy such as, for example, automatic occupancy- and/or weight-dependent adjustment of certain seat components as well as the occupancy- and/or weight-dependent deployment of an airbag module.

SUMMARY OF THE INVENTION

[~~The~~]An object of the invention is to specify a new, advantageous arrangement of a weight sensor on a seat structure.

[~~This object is accomplished according to the invention through the provision of a seat assembly with the characteristics of claim 1.~~]

Accordingly, the tubular drive element pivotably connected with a seat element is mounted on the seat element via the weight sensor.

The solution according to the invention has the advantage that a protected arrangement of the weight sensor between the tubular drive element and the associated seat element is possible[,] in which the sensor can[~~, in particular,~~] extend into the tubular drive element. The solution according to the invention further enables the integration of the weight sensor into a preassembled modular unit. This results in simple assembly and ease of assembly of the seat assembly as a whole.

The term weight sensor here means any sensor that generates sensor signals as a function of the force of the weight occurring when the seat is occupied.

The seat structure comprises all structural elements of a motor vehicle seat including its subassembly, [~~for example, in the form of~~]which may in some embodiments include telescoping guide rails.

[~~According to a preferred~~]In one embodiment of the invention, the tubular drive element is pivotably mounted on a mounting section of the weight sensor[~~,~~] which extends axially into the inside of the tubular drive element or into a mounting element forming an adapter (tube adapter) nonpivotably connected to the tubular drive [~~dement and which~~]element. The weight sensor can be [~~provided for adaptation~~]adapted to tubular drive [~~dements~~]elements of different diameters [~~by~~]using an adapter[~~,~~] which in a particular[~~, in~~] embodiment takes the form of an adapter bushing.

[~~The~~]In an exemplary embodiment of the present invention, the pivotable mounting of the tubular drive [~~dement~~]element on the weight sensor occurs [~~preferably~~]via a mounting [~~dement~~]element arranged on the tubular drive [~~dement,~~]element which can[~~, for example,~~] be screwed on the inside or outside wall of the tubular drive [~~dement~~]element via suitable threads[~~ or~~]. The mounting element can also be attached thereto via any integral connection (such as that produced by welding), via a frictional connection (produced by application of pressure) or a formfitting connection. Furthermore, an integral attachment of a mounting [~~dement~~]element (serving as a tube adapter) on the tubular drive [~~dement~~]element can also occur using an adhesive, for example, by gluing the mounting [~~dement~~]element against the inside wall of the tubular drive [~~dement.~~]element. The adhesive also serves [~~here for the compensation or reconciliation of~~]to compensate or

reconcile tolerances and holds the mounting [dement]element rattle-flee in the tubular drive [dement]element.

[According to a preferred improvement]In a further embodiment, the gluing of the mounting element into the tubular drive element occurs after making a preassembled assembly from the weight sensor and the mounting element pivotably mounted thereon.[For] To this end, the mounting element [must be]is axially retained on the mounting section of the weight sensor. For this,[for which] known locking elements[,] such as[, for example,] nuts[,] can be used. Along one direction, the axial retention can even be implemented by the main body of the weight sensor itself.

[According to one]In yet another embodiment, the mounting element is designed [with]having multiple parts[, where] wherein one part of the mounting element has a [beating]bearing area for pivotable mounting on the mounting section of the weight sensor and the other part of the mounting element has an attachment area for nonpivotable connection to the tubular drive [dement:]element. The two parts of the mounting [dement]element can be nonpivotably connected to each other via a screw connection[, for example, in that]; in an exemplary embodiment the two parts of the mounting element are each designed as threaded bushings, of which one has on its inside the bearing area and on its outside a thread and the other has on its inside a thread and on its outside the attachment area for the connection to the tubular drive [dement.]element. This can also be designed as a [beating]bearing bushing with the use of a one-piece mounting [dement]element.

According to one embodiment of the invention, the

mounting section of the weight sensor serves as a radial bearing for the tubular drive [dement]element and has an additional support [dement for the axial retention of]element to axially retain the tubular drive [dement]element in one direction[, where the]. The support element can be attached as a separate [dement]element on the mounting section or can be formed in one piece thereon[,—]. Along the opposing axial direction, the tubular drive element can be secured against axial displacement by the main body of the weight sensor.

[According to another]In a further embodiment of the invention, the mounting section of the drive [sensor [sic ?]weight sensor[,]] serves for both the radial and axial mounting of the tubular drive element. The mounting of the tubular drive element on the mounting section of the weight sensor can in this case be implemented [via]using meshing threaded areas.

[The]In an exemplary embodiment, the weight sensor is[preferably] an electrically operated sensor[, by means of which,]. Using this sensor, the bending strain acting on the tubular drive element is detected upon loading of the motor vehicle seat with a motor vehicle passenger positioned thereon[, the bending stain] acting on the tubular drive element is detected[. The solution according to the invention]. The exemplary embodiment enables an arrangement of the weight sensor [Such]such that the transverse forces causing bending strain are supported under defined, reproducible conditions.[For] To this end, the weight sensor is arranged nonpivotably[, e.g.,] (for example by means of a lock nut[,]) on the seat element serving for the mounting of the tubular drive element.

According to an [improvement of the invention]alternative

embodiment, the weight sensor [consists of]includes two sensor parts nonpivotably connected to each other, one of which serves [for the pivotable mounting of]to pivotably mount the tubular drive element and the other to produce a nonpivotable connection with the associated seat element. This [variant]alternative embodiment of the invention enables a particularly advantageous integration of the weight sensor into the seat assembly between the tubular drive element and the associated seat [dement,]element in which[, in particular,] flexible conditions are produced for the creation [ofpreassembled]of preassembled modular units including the weight sensor.

The tubular drive [dement]element can[, in particular,] be a drive tube for seat height displacement[,] which is rotated [for adjustment of]adjust the seat height and which runs from one seat side to the other seat side as a transverse tube at a right angle to the longitudinal seat direction.

The seat [dement]element serving [for the mounting of]to mount the drive tube can[, for example,] be a seat side part or a guide rail for longitudinal displacement of the seat or a mounting angle attached thereon.

Additional characteristics and advantages of the invention will become clear with the following description of exemplary embodiments with reference to the figures.

[They depict:]

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1a shows a first exemplary embodiment of a weight sensor preassembled on a drive tube, [~~via~~]through which weight sensor the drive tube can be pivotably mounted on a seat part;

Fig. 1b [~~a first variant of the exemplary~~]shows an alternative to the embodiment of Fig. 1[~~a with regard to~~]a concerning the axial retention of the drive tube relative to the weight sensor;

Fig. 1c [~~a second variant of the exemplary~~]shows another alternative to the embodiment of Fig. 1[~~a with regard to~~]a concerning the axial retention of the drive tube relative to the weight sensor;

Fig. 2a [~~a variant of the exemplary embodiment of Fig. 1 a with regard to~~]shows an alternative to the embodiment of Fig. 1a concerning the pivotable mounting of the drive tube on the weight sensor;

Fig. 2b [~~a first variant of the exemplary~~]shows an alternative to the embodiment of Fig. 2a [~~with regard to~~]concerning the axial retention of the drive tube relative to the weight sensor;

Fig. 2c [~~a second variant of the exemplary~~]shows another alternative to the embodiment of Fig. 2a [~~with regard to~~]concerning the axial retention of the drive tube relative to the weight sensor;

Fig. 3 shows the [~~arrangement~~]embodiment of Fig. 2c together with a seat element, on which the drive tube is pivotably mounted via the weight sensor;

Fig. 4 [~~a variant of the exemplary embodiments of Fig. 1~~]shows an alternative to the embodiment of Figs. 1a and 2a [~~with regard to~~]concerning the pivotable mounting of the drive tube on the

weight sensor [~~as well as with regard to~~]and the axial retention of the drive tube relative to the weight sensor;

Fig. 5a shows a drive tube pivotably mounted on a side part of a seat via a two-part weight sensor[~~,~~];

Fig. 5b [~~a variant of~~]shows an alternative to the [~~exemplary~~]embodiment of Fig. 5a [~~with regard to~~]concerning the attachment of the weight sensor on the side part of the seat;

Fig. 6 [~~a variant of~~]shows an alternative to the exemplary embodiment of Fig. 5b [~~with regard to~~]concerning the pivotable mounting of the drive tube on the weight sensor;

Fig. 7 shows the [~~arrangement~~]embodiment of Fig. 5a together with additional seat components;

Fig. 8 shows another exemplary embodiment of a weight sensor assembled on a drive tube, [~~via~~]through which weight sensor the drive tube can be pivotably mounted on a seat part;

Fig. 9 shows a schematic side view of a motor vehicle seat.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 9 schematically depicts a motor vehicle seat, [~~whose~~]the seat structure of which comprises two seat side parts S arranged on the two longitudinal sides of the motor vehicle seat S (only one of which is discernible in the side view according to Fig. 9)[~~as well as~~]. Fig. 9 also depicts a seat back R tiltably connected to the two seat side parts[~~.~~] S. The seat side parts S serve to accommodate a seat bucket, on which a seat cushion [~~constituting the~~]providing a seating surface for a motor vehicle passenger is arranged. The seat side parts S

are[in] each [case]hingedly connected via front and rear adjusting levers V with a longitudinal seat guide that comprises a first guide rail, [(]subrail U[)] fixedly arranged on a car body as well as a seat side guide rail displaceable relative to the rail fixed to the car body, [(]upper rail O[)].

For adjustment of the seat height[, i.e.,] (which comprises in the embodiment shown the vertical distance of the seating surface from the longitudinal seat guide), the two adjusting levers V are hinged[, with one]. One of the adjusting levers is associated with an adjustment drive and the other adjusting lever[, as] is a passive adjustment lever which merely reproduces the hinged movement induced by the first adjusting lever.

In the [example]exemplary embodiment of a seat structure depicted in Fig. 9, a drive tube 2 [is]associated with the rear adjusting lever V[, which drive tube] forms the lower axis [via]about which the adjusting lever V is rotatably hinged to the upper rail O of the longitudinal seat guide. The drive tube 2 is[designed as] a transverse tube that runs from the rear adjusting lever V on one longitudinal side of the motor vehicle seat at a right angle to the longitudinal seat direction x [(longitudinal axis of the vehicle] or longitudinal direction of the rails[)]to the corresponding rear adjusting lever of the seat side part arranged on the other longitudinal side of the motor vehicle seat. In alternative embodiments, the seat direction x comprises either the longitudinal axis of the vehicle, or longitudinal direction of the rails.

[To determine the occupancy of the] seat by a motor vehicle passenger[in such a known motor vehicle seat, weight]Weight sensors are known that detect

the occupancy of [~~the seat~~]a known motor vehicle seat by a motor vehicle passenger. The sensors operate by using the difference in weight between an occupied and an unoccupied seat and, optionally, the weight of the user of the seat as well as by determining the position and size of the user of the seat by determining a fictitious center of gravity. As a function of the occupancy of the seat, it is possible, for example, to control the longitudinal displacement of the seat by means of guide rails O, U or an air bag module associated with the motor vehicle seat.

Fig. 1 a depicts a first exemplary embodiment [~~of an arrangement according to~~]the invention [~~of~~]having a weight sensor 3 in a motor vehicle seat of the type depicted in Fig. 9. Accordingly, the weight sensor 3 constitutes an assembly that can be preassembled together with the drive tube 2[~~,~~] and in which the drive tube 2 is pivotably mounted on the weight sensor 3. The weight sensor 3 is an electrically operated sensor[~~, whose~~] the function of which will be presented in greater detail [~~in the following~~]below with reference to Fig. 3. The weight sensor 3 has a main body 30 provided with an external thread 33[~~, in which body the~~]. The sensor components necessary to generate a weight-dependent sensor signal [~~are arranged,~~]as well as a journal 35 spaced at a distance from the main body 30 in the axial direction A (longitudinal direction of the drive tube 2)[~~, which~~] are arranged in the main body 30. The journal 35 extends into the inside of the drive tube 2.

[~~On~~] ~~the threaded exterior of the wall 20 of the drive tube 2~~[~~, a~~]A mounting element 4 in the form of a bearing bushing with a thread 41 is

screwed[.] on the threaded exterior of the wall 20 of the drive tube 2. This mounting element 4 has a mounting section 44[, ~~which runs on~~] running from the end of the drive tube 2 facing the sensor 3 all the way to the journal 35 of the weight sensor 3, spaced at a distance from its main body 40 such that the drive tube 2 is mounted radially via the mounting element 4 pivotably on the journal 35 of the weight sensor 3.

The main body 30 of the sensor 3 (which is arranged in front of one end of the drive tube 2 outside the drive tube) serves[~~, on the one hand, for the axial retention of~~] to axially retain the drive tube 3 on the journal 35 of the weight sensor 3, as does[~~, on the other hand,~~] an axial locking element 36 arranged on the journal 35[~~, e.g.,~~] (for example in the form of a clamping ring). Thus, the mounting section 44 of the mounting element 4 attached [~~on~~]to the drive tube 2 is [~~accommodated~~]fixed axially and substantially immobile between the main body 30 and the axial locking element 36 of the weight sensor 3.

Thus, the weight sensor 3 and the drive tube 2 constitute an assembly that can be preassembled[,] and which [~~is distinguished by~~]features a simple construction as well as [~~advantageous~~]an ease of installation on a corresponding seat element[~~, cf. in this regard, the following statements about Fig. 3.~~]. In comparison, consider the discussion regarding Fig. 3 below.

Fig. 1b depicts [~~a variant of the arrangement of~~]an alternative embodiment to that shown in Fig. 1 a, in which the [~~difference consists in that the~~]journal 35 of the weight sensor 3 has an external thread 35a[,] on which a nut is screwed as an axial locking element 37[~~ (instead of~~]. This is provided as an alternative to the

clamping ring 36 of Fig. 1a[.].

In the exemplary embodiment depicted in Fig. 1c, an adapter in the form of an adapter bushing 38 is screwed onto the external thread 35a of the journal 35 of the weight sensor 3[, which]. The adapter forms[, on the one hand,] a radial bearing for the drive tube 2[, i.e., defines,] by defining together with the mounting [dement]element 4 of the drive tube 2[,] a radial bearing 45[, and which]. The adapter also serves[, on the other hand] (together with the main body 30 of the weight sensor 3)[, for the axial retention of] to axially retain the drive tube 2 relative to weight sensor 3.

The adapter bushing 38 enables adaptation of the journal 35 to drive tubes 2 of different diameters or to differently designed mounting elements 4.

Fig. 2a [depicts a variant of]shows an alternative to the[exemplary] embodiment of Fig. [1a with regard to]1a regarding the attachment of the mounting element 4' in the form of a bearing bushing on the drive tube 2. According to Fig. 2a, the bearing bushing 4' [with]having an external thread 42 is screwed into the inside wall 22 of the drive tube 2 which is provided with an internal thread. The mounting section 44 of [this]the bearing bushing 4' is thus formed by the main body 40 provided with the thread 42. An axial locking element 36 in the form of a clamping ring serves here, as in the exemplary embodiment [according to]of Fig. 1a, [for the axial retention of]to axially retain the drive tube 2 mounted on the journal 35 of the weight sensor 3 via the radial bearing 45.

Fig. 2b depicts a variant of the arrangement of Fig. 2a,

in which the axial locking element 37 is formed by a nut screwed onto an external thread 35a of the journal 35.

Fig. 2c depicts[~~, in a variant of the arrangement of~~] an alternative to the embodiment shown in Fig. 2a[~~,~~] in which a weight sensor 3[~~, in which~~] having an adapter bushing 39 [~~is~~]screwed onto the external thread 35a of the journal 35[~~—that~~]. The journal 35 forms (according to the [~~arrangement of~~]embodiment shown in Fig. 1 e) a radial bearing 45 together with the bearing bushing 4' and[~~, furthermore,~~] serves [~~for the axial retention of~~]to axially retain the drive tube 2 relative to the weight sensor 3.

The screwing of a bearing bushing 4' with a thread [~~on~~]into the inside wall 22 of the drive tube 2 depicted in [~~each case in Fig~~]Figs. 2a through 2c is particularly suited for drive tubes with large diameters, or for those applications in which no space is available for attachment of the mounting [~~dement~~]element on the outside wall 21 of the drive tube 2.

Fig. 3 depicts [~~the~~]a preassembled modular unit [~~consisting of~~]having the drive tube 2 and the weight sensor 3 shown after incorporation into a motor vehicle seat[~~, that~~] accomplished by attachment on a mounting angle 1 of the corresponding seat structure[~~, where the~~]. The weight sensor 3 penetrates with its main body through an opening 10 of the mounting angle 1 substantially without play and is attached on the mounting angle 1 by means of a nut 51 as well as an associated lock nut 52[~~, which~~]. The nut 51 and associated lock nut 52 are screwed on the two sides of the mounting angle 2 on the external thread 33 of the main body 30 of the weight sensor 3.

[~~Thus, in~~]In this case, the weight sensor 3 is nonpivotably

attached on the mounting angle 1 and also serves [~~for the pivotable mounting of~~]to pivotably mount the drive tube 2 on the journal 35. Accordingly, the drive tube 2 is [~~thus~~]pivotably connected via the weight sensor 3 to the seat element 1 in the form of a mounting angle. The weight sensor 3[~~here thus~~] additionally assumes the necessary function [~~of a pivotable~~]pivotably mounting[~~of~~] the drive tube 2 on the mounting angle 1. In addition to [~~the capability of~~]enabling preassembly of the weight sensor 3 with the drive tube 2 (with the main body 30 of the weight sensor 3 provided with an external thread 33 forming a defined interface with the associated seat element (mounting angle 1)) as well as the simple structure of the overall arrangement, the protected mounting of the weight sensor 3 - partially in the inside of the drive tube 2 and partially surrounded by the mounting angle 1 as well as the associated lock nut 51, 52 - is, above all, advantageous.

In addition, this arrangement ensures that the forces of weight occurring with occupancy of the corresponding motor vehicle seat, which act as transverse forces F on the drive tube 2, are always detected in the same manner by the sensor 3. This is attributed to the defined support of the sensor 3 with its main body 30 against the edge of the opening 10 of the mounting angle I damped between the two nuts 51[~~,~~] and 52. Thus, a bending of the drive tube 2 [~~accompanying~~]resulting from the transverse forces F generated by seat occupancy that is detected by the sensor 3 via the journal 35 extending into the drive tube can be reproducibly determined and evaluated, such that erroneous deployments are reliably avoided.

Fig. 4 depicts [~~a variant~~]an alternative to the embodiments of the preassembled modular units depicted in [~~Fig~~]Figs. 1 a through 1 c [~~as well as~~]and 2a through 2c [~~with regard to~~]concerning the attachment of the mounting element 4" on the drive tube 2. According to Fig. 4, the mounting element 4" is attached on one end of the drive tube 2[~~, e.g.,~~] (by welding[~~.~~] in an exemplary embodiment). The radial bearing 45, [~~via~~]through which the drive tube 2 is mounted on the journal 35 of the weight sensor 3[~~, thus~~] lies outside the interior of the actual drive tube 2.[~~For the axial retention of~~] To axially retain the drive tube 2 relative to weight sensor 3, a locking element in the form of a wedge 36' is pressed into a radial bore of the journal 35 extending into the inside of the drive tube 2. For this, a corresponding assembly opening M is provided in the wall 20 of the drive tube 2.

In the modular unit depicted in Fig. 5a, the weight sensor 3 is made up of two sensor parts 31[~~,~~] and 32 nonpivotably connected to each other, of which [~~one~~]the sensor part 31 serves [~~for the nonpivotable connection of~~]to nonpivotably connect the weight sensor 3 to a mounting angle 1 of the seat structure and the [~~other~~]sensor part 32 serves [~~for the pivotable mounting of~~]to pivotably mount the drive tube 2 on the weight sensor 3.

The first sensor part 31 penetrates an opening 10 of the mounting angle 1 and lies against the edge of the opening with an angled protrusion 31 a. On the other side of the opening 10, a lock nut 51 is screwed onto an external thread 33 of the first sensor part 31[~~,~~] such that the mounting angle 1 is firmly

clamped between the radially outward projecting protrusion 31a of the first sensor part 31 and the lock nut 51. [~~The~~]Thus, the first sensor part 31 is[~~thus~~] fixed nonpivotably on the mounting angle 1. An electronic assembly 6, as well as an electric plug connector 60 of the weight sensor 3 are further arranged on the first sensor part 31, such that the sensor 3 [[~~sic ?~~]is[]] supplied with electrical energy via the first sensor part 31 and can output sensor signals through it.

The second sensor part 32 has a journal 35 extending into the inside of the drive tube 2[;] which, with a mounting element 4"' nonpivotably arranged on the inside wall of the drive tube 2, forms a radial bearing 45 for the pivotable mounting of the drive tube 2 on the weight sensor 3.[~~For the axial retention of~~] To axially retain the drive tube 2 relative to the weight sensor 3, the mounting element 4"' is supported on the [~~one hand on the~~]main body of the second sensor part 32 [~~and on the other~~]as well as (in the interior of the drive tube 2) on a locking element 37 in the form of a nut [~~that is~~]screwed onto an external thread 35a of the journal 35.

To prevent excess rigidity in the mounting of the drive tube 2 via the mounting element 4'" on the journal 35a, the mounting element 4"' and the journal 35 are spaced at a distance from each other in the radial direction outside the radial bearing 45[~~; a~~]. A gap Z is thus present in each case in the radial direction to [~~produce~~]provide bearing clearance.

Fig. 5b depicts [~~a variant of the exemplary~~]an alternative embodiment [~~of~~]to that shown in Fig. 5a, in which the [~~difference consists in the attachment of the first sensor part 31 on the mounting angle 1. According to~~

~~Fig. 5b, the~~]first sensor part 31 is supported on a radially outward projecting protrusion 31 a on the end of the edge of the opening 10 in the mounting angle 1 facing the drive tube 2, and the associated lock nut 52 is located on the end of the edge of the opening 10 facing away from the drive tube 2. The arrangement of the radial protrusion 31 a and the associated lock nut is thus precisely reversed relative to the exemplary embodiment depicted in Fig. 5a. This enables complete preassembly of the assembly [~~consisting of~~]including the drive tube 2 and the two sensor parts 31[~~,~~] and 32[~~, which~~]. The assembly is then introduced into the opening 10 of the mounting element 1[~~,~~] such that the first sensor part 31 with its section [~~provided with~~]having an external thread 33 penetrates the opening 10 and lies with its radially projecting protrusion 31 a against the edge of the opening.[~~This positioning~~] The position of the weight sensor 3 is then secured by [~~the~~]screwing [~~on of~~]the lock nut 52 on the external thread 33 of the first sensor part 31.

Fig. 6 depicts [~~a variant of the arrangements of Fig~~]an alternative to the embodiments shown in Figs. 5a and 5b[~~,~~] in which coordinated threaded areas 35a[~~,~~] and 46 of the journal 35[~~, on the one hand,~~] and[~~of~~] the mounting elements 4'", [~~on the other hand~~]respectively, serve [~~for the mounting of~~]to mount the mounting element 4'" molded with the drive tube 2 on the journal 35 of the second sensor part 32. Thus, the bearing itself directly takes over the necessary axial retention of the drive tube relative to weight sensor 3[~~. It is possible to do~~] without the need for additional, separate axial locking elements.

However, [~~the~~]forming [~~of~~]the bearing by meshing threaded

areas by rotation of the drive tube 2 results in a relative movement of drive tube 2 and thread weight sensor 3[~~[sic ? weight sensor]~~] along the tube axis A (corresponding to the transverse axis of the vehicle y)[~~, with the~~]. The extent of this movement [~~depending~~]depends on the pitch of the meshing threads 35a[~~,~~] and 46. This movement can be compensated for by play provided in the arrangement as well as the ever-present elasticities.

Fig. 7 depicts the [~~arrangement of~~]embodiment shown in Fig. 5a together with additional [~~components of a~~]seat structure components, namely a subrail U [~~that is~~]fixed on the motor vehicle floor B, as well as an upper rail O[~~that is~~] guided and longitudinally displaceable on the subrail U[~~and~~]. The upper rail O is attached on the mounting angle 1 that serves [~~for~~]as the pivotable mounting of the drive tube 2 via the weight sensor 3. In Fig. 7, an adjusting lever V (cf. Fig. 9) is shown nonpivotably connected to the drive tube 2[~~is further discernible, which~~]. The adjusting lever V serves [~~for the adjustment of~~]to adjust the seat height.

With reference to Fig. 7[~~, the protected arrangement of~~] the weight sensor 3 is shown positioned partially inside the drive tube 2 as well as partially covered by the mounting angle 1 and protected laterally by the [~~guide O, U, in particular, becomes clear~~]guides O and U.

In the particularly easy to assemble exemplary embodiment depicted in Fig. 8, the main body 30 of the weight sensor 3 is attached [~~with its main body 30~~]to a mounting angle 1[~~,~~] which can serve[~~, for example, for the arrangement of~~] to secure the weight sensor on a guide rail of a longitudinal seat guide of a motor vehicle

seat. The main body 30 of the weight sensor extends [~~for this with its main body 30~~]substantially without play into an opening 10 of the mounting [~~angles~~]angle 1 and is fixed thereon by means of at least one nut 53 screwed onto an external thread 33 of the main body 30 of the weight sensor 3.

The weight sensor 3 has a mounting section 35a stepped in one piece from the main body 30, which forms two circumferential bearing surfaces 350[,] and 351[,] oriented at right angles to each other and connecting directly with each other, and on which a bearing bushing 4a provided with an external thread 452 is pivotably mounted by means of corresponding circumferential bearing surfaces 450[,] and 451 oriented at right angles to each other.

The bearing bushing 4a is secured on the mounting section 35 of the weight sensor 3 in the axial direction[~~-on the one hand in that it~~]. It is supported axially via its angled bearing surface 451 against the associated angled bearing surface 351 of the weight sensor 3[~~-and~~]. It is secured in the opposite direction against axial slippage by means of a lock nut 37 screwed on to an external thread 352 of the weight sensor 3.

The bearing surfaces 350, 351[,], 450[,] and 451[~~-mentioned~~], as well as the axial retention or mounting of the bearing bushing 4a by means of the associated lock nut 37, can optionally be supplemented and improved in their efficiency by additional plain bearings and/or axial disks ~~and improved in their efficiency~~. Furthermore, the bearing areas [~~mentioned~~]can be designed with angular movement to keep disrupting influences[,] (such as[,] for example[,] tolerances or angular movements of the structure)

away from the weight sensor 3. To set a predefined axial play between weight sensor 3 and bearing bushing 4a, the lock nut 37 is firmly screwed onto the weight sensor 3 up to a defined axial stop. For production engineering reasons, it may be necessary to use a spacing element 370 to bridge the thread runout in the lock nut 37.

Because of the axial retention of the [~~beating~~]bearing bushing 4a provided with an external thread 452 on the mounting section 35 of the weight sensor 30 between its angled bearing surface 351 [~~on the one hand~~]and the lock nut 37[~~ on the other~~], the weight sensor 3 can be combined with the bearing bushing 4a into a preassembled assembly[~~,~~] onto which the drive tube 2 (in the form of a transverse shaft) is subsequently attached.

For this[~~,~~] combination, a threaded bushing 4b is attached (for example by welding) in the region of the front end of the main body 20 of the drive tube 2[~~ a threaded bushing 4b~~], and provided with an internal thread 453 [~~that runs~~]running along the end facing the weight sensor 3 with an attachment section 455 as well as along a part of the outside wall 21 of the drive tube 2[~~ is attached (e.g., by welding).~~]. By screwing this threaded bushing 4b with its internal thread 453 onto the external thread 452 of the bearing bushing 4a, a nonpivotable connection is produced between drive tube 2 and [~~beating~~]bearing bushing 4a[~~ such that the~~]. The drive tube 2 is mounted via the threaded bushing 4b and the bearing bushing 4a is pivotably mounted on the bearing surfaces 350[~~,~~] and 351 of the mounting section 35 of the weight sensor 3.

In [~~a preferred variant~~]an exemplary embodiment, the drive tube 2

and the threaded bushing 4b can be designed in one piece[,] with a thread 453 cut directly into the drive tube 2.

[~~Alternatively~~]In an embodiment alternative to the above-described welded connections between the drive tube 2 and a respective mounting element[,] via which the drive tube 2 is mounted on the mounting section 35 of the weight sensor 3, a mounting element [-](which can be optionally preassembled on the mounting section 35 of the weight sensor 3[—]) can also be attached by gluing on the drive tube 2[~~, and, in particular, in fact,~~]. In a further embodiment, the mounting element can be attached by an adhesive connection with the inside wall 22 of the drive tube 2. The adhesive also serves [~~here for the compensation or reconciliation of~~]to compensate or reconcile tolerances on the inside of the drive tube 2 and holds the mounting element serving as an adapter rattle-free in the drive tube 2.